One of the results of the Institute's organization has been the arrangement for visits to this country of many foreign scholars and professors, and for our professors to lecture in foreign universities. Since the Institute pays travelling expenses both ways the arrangement may obviously be a happy one for those on sabbatic leave. In 1920–21 grants were made to 17 American professors to lecture in 9 countries: Argentina, Bohemia, China, England, France, Greece, Italy, Spain, and Turkey. The only mathematician was Professor SOLOMON LEFSCHETZ, of the University of Kansas, who lectured at the University of Rome. The Institute's *Annual Report*, of February 15, 1921, states that Doctor E. A. HORNE, professor of mathematics at the University of Patna, Patna, India, has been invited to this country by Harvard University.

Some publications of the Institute will be found invaluable for American students in certain foreign countries. We have already noticed the notable monograph of Kenneth McKenzie on *Opportunities for Higher Education in Italy* (61 pages; see *1919*, 300–301). There are also: *Opportunities for Higher Education in France* (148 pages), and G. E. MacLean's *Opportunities for Graduate Study in the British Isles* (40 pages). The *Guide Book for Foreign Students in the United States* (published July 1, 1921; 100 pages) will also be of interest to college teachers. Another similar bulletin, just published by the Bureau of Education, Washington (Bulletin, 1921, no. 6), is entitled: *Opportunities for Study at American Graduate Schools* (59 pages).

ARTICLES IN CURRENT PERIODICALS.

AMERICAN JOURNAL OF MATHEMATICS, volume 43, no. 2, April, 1921: "Boundary value and expansion problems: algebraic basis of the theory" by R. D. Carmichael, 69–101; "Algebraic theory of the expressibility of cubic forms as determinants, with application to Diophantine analysis" by L. E. Dickson, 102–125; "The impossibility of Einstein fields immersed in flat space of five dimensions" by E. Kasner, 126–129; "Finite representation of the solar gravitational field in flat space of six dimensions" by E. Kasner, 130–133; "On the motion of two spheroids in an infinite liquid along their common axis of revolution" by B. Datta, 134–142.

BULLETIN OF THE AMERICAN MATHEMATICAL SOCIETY, volume 27, May, 1921: "The February meeting of the American Mathematical Society" by R. G. D. Richardson, 341–351; "Note on equal continuity" by J. F. Ritt, 351–353; "A new method in Diophantine analysis" by L. E. Dickson, 353–365; "The transformation of elliptic integrals" by J. H. McDonald, 366–373; "Bachmann on Fermat's last theorem" by H. S. Vandiver, 373–376 [Review of *Das Fermatproblem in seiner bisherigen Entwickelung* (Berlin and Leipzig, 1919)]; "Two books about airplanes" by E. W. Brown, 377–381 [Review of E. B. Wilson's *Aeronautics: A class text* (New York) and of H. G. Bader's *Grundlagen der Flugtechnik: Entwerfen und Berechnung von Flugzeugen* (Berlin)]; Review by F. M. Morgan of E. Beutel's *Die Quadratur des Kreises* (Leipzig and Berlin, 1920), 382; Notes, 383–386; New Publications, 386–388.

MATHEMATICAL GAZETTE, volume 10, March, 1921: "Address on relativity" by A. S. Eddington, 228–233; "The teaching of mathematics to boys whose chief interests are non-mathematical" by S. H. Clarke, 234–238; "The early history of the Association, or the passing of Euclid from our schools and universities and how it came about" by J. M. Wilson, 239–244; "Further reminiscences" by A. A. Bourne and F. S. Marshall, 244–247; "Mathematics in the lycées" by E. M. Read, 248–254—May, 1921: "Aeroplane mathematics" by S. Brodetsky, 257–281; "Gleanings far and near," 281; Reviews, 282–288 [review of T. Muir's *The Theory of Determinants in the Historical Order of Development*, vol. 3; etc.].

MATHEMATICS TEACHER, volume 14, no. 2, February, 1921: "Outstanding pedagogical principles now functioning in high-school mathematics" by G. W. Myers, 57–63; "The geometry of the junior high school" by J. C. Brown, 64–70; "Algebraic magic squares" by H. P. McLaughlin, 71–77; "The outlook with regard to school mathematics" by W. P. Webber, 78–84; "Mathe-

matics in Stuyvesant High School" by W. E. Breckenridge, 85–87; "Articulation of junior and senior high school mathematics" by J. K. Van Denberg, 88–94; News and Notes, 95–101; Discussion, 102–103; New Books, 104–105—No. 3, March: "Terms and symbols in elementary mathematics," 107–118 [A preliminary report by the National Committee on Mathematical Requirements]; "The recitation in mathematics" by J. H. Minnick, 119–123; "Certain mathematical ideals of the junior high schools" by D. E. Smith, 124–127; "Geometry detected by Sherlock Holmes" by B. B. Hedges, 128–136; "Remarks on the report of the National Committee on Mathematical Requirements on College Entrance Requirements" by E. R. Hedrick and H. D. Gaylord, 137–142; "The problem of home work papers" by J. R. Overman, 143–146; "Teaching incommensurables" by Vera Sanford, 147–150; Round Table Discussion, 151–155; News and Notes, 156–158; Book Reviews, 159–160.

MESSENGER OF MATHEMATICS, volume 50, no. 5, September, 1920: "On a Diophantine problem" (third paper, continued) by H. Holden, 65–75; "Circular parts: the general case" by W. W. Johnson, 76–80—Nos. 6–7, October–November: "Factorization of N, treated as a bicomposite, special regard being paid to the sum of its digits and to the consequent possible sums of the digits of its twin factors, after casting out the nines" by D. Biddle, 81–95; "A differential equation occurring in the theory of the propagation of waves" by H. Bateman, 95–100; "Summation of q-hypergeometric series" by F. H. Jackson, 101–112—No. 8, December: "On the generating function of the series $\Sigma F(n)q^n$, where $F(n)$ is the number of uneven classes of binary quadratics of determinant $-n$" by L. J. Mordell, 113–128.

NATURE, volume 107, March 31, 1921: "Electrical theory and relativity" by A. R. [review of J. H. Jeans's *The Mathematical Theory of Electricity and Magnetism* (Cambridge, 1920)], 133–134; "Mathematical text-books" by H. B. H. [review of C. Davison's *The Elements of Plane Geometry* (Cambridge, 1920), of W. G. Dunkley's *A Primer of Trigonometry for Engineers* (London, 1920), of S. B. Gates's *Pure Mathematics for Engineers* (2 vols., London, 1920), of P. J. Haler and A. H. Stuart's *A Second Course in Mathematics for Technical Students* (London, 1920), of W. P. Webber's *Elementary Applied Mathematics* (New York and London, 1920), of S. H. Stelfox's *The Laws of Mechanics* (London, 1920) and of J. W. Landon's *Elementary Dynamics* (Cambridge, 1920)], 134–136—April 28: Review of R. D. Carmichael's *The Theory of Relativity* (second edition, New York, 1920), 264; "The concept of 'space' in physics" by H. Jeffries, 267–268—May 5: "Logs and antilogs" a letter by R. T. A. I., 300–301 ["On p. 7 of *Nature* of March 3 a recommendation is mentioned that when taking out the number corresponding to a logarithm a table of antilogs should be used. Assuming the usual seven-figure work, the opposite course should be followed, because the computer can then write down five figures at once and add the remaining two by means of the difference table; no addition or crossing out is required. Thus for the logarithm 0.1234567 the log table gives 1.3287 for 1234269, and 298 in the 327 difference table gives 91, so we write 1328791. *Vice versa*, having 1.328791, what is the logarithm? The antitable gives 12345 at once, whilst the difference 20 gives 67, so that we write 1234567. No figure requires alteration and the work is done with a minimum of mental strain.

"As one who does a great deal of computation, let me state that my order of preference for usual work is Cotsworth's multiplication table (which is better than Crelle's), then the Triumphator or Brunsviga calculating machine, then Shortrede's table, which in one volume gives both logs and antilogs; but special tables can also be usefully employed. Thus Bottomley for all four-figure work is still the best; for multiplying two figures by four, Peters's table; and for two figures by three, Zimmermann's.

"Amongst the indispensable tables should be included Zech's addition and subtraction log table, which is easy to use and accurate. For eight-figure work the best, if not the only, tables are Bauschinger's and Peters's"].

PHILOSOPHICAL MAGAZINE, sixth series, volume 41, April, 1921: "On the supposed weight and ultimate fate of radiation" by O. Lodge, 549–557; "On a method of analysis suitable for the differential equations of mathematical physics" by W. L. Cawley and H. Levy, 584–607; "Motion and hyperdimensions" by F. Tavani, 647–651—May: "The physical significance of the least common multiple" by N. Campbell and E. C. C. Baly, 707–716.

PROCEEDINGS OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES, volume 56, no. 1, February, 1921: "Acoustic impedance and its measurement" by A. E. Kennelly and K. Kurokawa, 1–42 [Bibliography, 20 titles, pp. 38–39; list of symbols employed, pp. 40–42]—No. 7, April: "Anaximander's book, the earliest known geographical treatise" by W. A. Heidel, 239–288.

REVUE SCIENTIFIQUE, volume 59, March 12, 1921: "Les progrès de l'astronomie physique" by H. Deslandres, 97–101 [First paragraph: "L'extension considérable, prodigieuse, des recherches

scientifiques est un des caractères de notre époque. Les hommes de valeur et les établissements spéciaux qui leur sont consacrés sont en nombre toujours croissant, et cette belle progression est surtout frappante en Amérique. Nous avons vu, dans les cinquante dernières années, les découvertes succéder aux découvertes, et dans toutes les sciences. La physique a été favorisée de façon toute particulière; son domaine, déjà de belle étendue, s'est agrandi de terres nouvelles à la fois très riches et très vastes; les phénomènes de radiation et les phénomènes électriques y ont une place prépondérante"].

SCHOOL SCIENCE AND MATHEMATICS, volume 21, no. 5, May, 1921: "Teaching formulæ in the junior high school" by J. A. Nyberg, 409–417; "The Mathematical Association of America" by G. A. Miller, 418–422; "Diophantine analysis applied to the constructibility of regular polygons" by M. O. Tripp, 422–424; "Some observations concerning the history of science" by E. H. Johnson, 450–453; Problems and solutions, 483–488.

SCIENCE, new series, volume 53, April 29, 1921: "Euclid of Alexandria and the bust of Euclid of Megara" by F. Cajori, 414–415 [States that the portrait bust on a certain old Greek coin which is often published as that of Euclid the mathematician, really represents Euclid of Megara, the philosopher, who was formerly often confounded with his greater namesake]—May 27: "A section of the American Association on the History of Science" by L. C. Karpinski, 500–501 [Last paragraph: "History of science, using science with the inclusive meaning as in the title A. A. A. S., is surely the proper name for the new section now under way"]—June 10: "Inaugural address" by E. F. Nichols, 523–527 [as president of Massachusetts Institute of Technology].

SCIENCE PROGRESS, volume 15, no. 4, April, 1921: "Recent advances in pure mathematics" by Dorothy Wrinch, 517–522 [contains an elementary explanation of nomography, apropos of S. Brodetsky's book on the subject (*1921*, 131–132)]; "DeMoivre's theorem" by R. Ross, 627–628 [First paragraph: "I will be very much obliged to any of our mathematical readers who will be so kind as to inform me where I can find any record of the following proposition—which shows that DeMoivre's famous theorem connected with complex numbers is only a particular case of the iteration—that is, the *operative* involution—of a real algebraic function of which one of the parameters is reduced to zero. I have known the proposition for many years, and indeed indicated it in my paper on 'Operative Involution' in *Science Progress*, No. 50, p. 288, October, 1918, in some examples at the end, and in No. 51, p. 486, January, 1919, last example; but I have searched in vain for it through my books—even in the works of Hamilton, Tait, and Joly on quaternions, on which subject it has an important bearing"]; "Highways and byways in the theory of numbers" by L. J. Mordell, 647–652 [Review of L. E. Dickson's *The History of the Theory of Numbers*, volume 2 (Washington, 1920). First sentences: "All mathematicians interested in the theory of numbers, and this means sooner or later most pure mathematicians, will welcome volume ii of Prof. Dickson's 'Chronological History.' It notes practically everything written on the subject, sums up the results of a paper in a few lines, and might serve as a model of orderly arrangement. This history adds considerably to the increasing debt of mathematicians to America, and is a real necessity in their libraries"].

SCIENTIFIC MONTHLY, volume 12, May, 1921: "The history of mathematics" by E. W. Brown, 385–413 [Lecture delivered at Yale University, February 26, 1920. First paragraph: "The earliest dawn of science is without doubt not different from that of intelligence. But the civilized man of to-day, far removed as he is from the lowest of existing human races, is probably as far again from the being whom one would not differentiate from the animals as far as mental powers are concerned. What this difference is, neither ethnologist nor psychologist can yet tell. Perhaps the nearest approach to a definition, at least from the point of view of this article, is contained in the distinction between unconscious and conscious observation. We are familiar with both sides even in ourselves; records can be impressed on the brain and remain there apparently dormant until some stimulus brings them to fruition, and again, record and stimulus can appear together so that a train of thought is immediately started"]; "The history of science as an error breeder" by G. A. Miller, 439–443.

TECHNOLOGY REVIEW, volume 23, January, 1921: "Professor Cecil Hobart Peabody" by W. Hovgaard, 12–14 + portrait.

TRANSACTIONS OF THE AMERICAN MATHEMATICAL SOCIETY, volume 22, April, 1921: "On division algebras" by J. H. M. Wedderburn, 129–135; "Oscillation theorems for the real, self-adjoint linear system of the second order" by H. J. Ettlinger, 136–143; "New proofs of certain finiteness theorems in the theory of modular covariants" by Olive C. Hazlett, 144–157; "On the convergence of certain trigonometric and polynomial approximations" by D. Jackson, 158–166; "Determination of all general homogeneous polynomials expressible as determinants with linear

elements" by L. E. Dickson, 167–179; "Pseudocanonical forms and invariants of systems of partial differential equations" by A. L. Nelson, 180–197; "Arithmetical paraphrases (II)" by E. T. Bell, 198–219; "On the zeros of solutions of homogeneous linear differential equations" by C. N. Reynolds, Jr., 220–229; "A generalization of the Fourier cosine series" by J. L. Walsh, 230–239; "Polynomials and their residue systems" (to be continued) by A. J. Kempner, 240–266.

UNIVERSITY BULLETIN, Louisiana State University, new series, volume 13, no. 2, February, 1921: *Fundamental Aspects of Mathematical Training* by S. T. Sanders, 30 pages [First paragraph: "The tendency is outstanding in secondary education to exclude from courses of study the subject that does not have 'value in relation to other topics and to time involved.'[1] 'The ideal of practicality has now entered the schools with telling force. It has been manifested in its demand for vocational training, and it is reconstructing the older cultural training by eliminations and additions. Materials once accepted without question when schools had a margin of energy are now displaced by the pressure of new demands.'[2] 'But the meaning of the practical is not that of the eighteenth century. Arithmetic now represents tools which the child needs to control his present and potential quantity situations'[3]"].

UNTERRICHTSBLÄTTER FÜR MATHEMATIK UND NATURWISSENSCHAFTEN, volume 27, February 26, 1921: "Die Bedeutung der nichteuklidischen Geometrie für den Elementar-Unterricht" by A. Schülke, 3–6; "Rechentafel zur Auflösung zweier Gleichungen ersten Grades mit zwei Unbekannten" by P. Luckey, 8–9; "Das grösste einem gegebenen Kreisabschnitte eingeschriebene Rechteck und die grössten einem gegebenen Kugelabschnitte einbeschriebenen Kreiszylinder," by —. Friese, 9–11; "Zur Konstruktion des grössten Rechtecks in einem Kreissegment" by W. Gaedecke, 11–12; "Grenzwerte symmetrischer Verbindungen der Winkelfunktionen am Dreieck" by A. Emmerich, 12.

ZEITSCHRIFT FÜR MATHEMATISCHEN UND NATURWISSENSCHAFTLICHEN UNTERRICHT, volume 52, nos. 1–2, February 17, 1921: "Ein Weg zur Relativität für die Schule" by A. Schoenflies, 1–13; "Zur Theorie der komplexen Zahlen" by W. Schwan, 13–17; "Graphische Behandlung der Zinsrechnung" by A. Schülke, 17–19; "Für und wider das abgekürzte Rechnen" by K. Becker, 19–24; "Zur Reform des mathematischen Hochschulunterrichts" by E. Kamke, 24–26; "Die Möbiussche Form des Brechungsgesetzes" by R. Böger, 27–31; "Eine Bemerkung zum d'Hondtschen Wahlverfahren" by —. Behmann, 32–34; "Der Lehrsatz des Pythagoras als Sonderfall eines Höhensatzes" by A. Maennersdoerfer, 35–36; "Die Winkelmessung des Babyloniers, des Artilleristen, und des Mathematikers" by P. Luckey, 36–37; "Aufgabenrepertorium," 38–41; "Ueber den Nichtgebrauch und den Missbrauch der Mathematik bei den Begabten-prüfungen" by M. Vaërting, 41–46; "Bücherbesprechungen," 46–55.

UNDERGRADUATE MATHEMATICS CLUBS

All reports of club activities should be sent to E. L. Dodd, 3012 West Ave., Austin, Texas

CLUB ACTIVITIES.

THE MATHEMATICS CLUB OF HUNTER COLLEGE, New York City.

[*1918*, 187.]

Prior to October, 1919, meetings were held monthly, as follows:

January, 1919: "Sun dials" by Anita Rosenthal '19.

March: Reception to freshmen.

April: "Prominent mathematicians of the present day" by Edith Gaddis '21; "Paper folding," under the direction of Anita Rosenthal '19.

May: "Perfect, amicable, square, and triangular numbers" by Laura Guggenbuhl '22.

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[1] "Bulletin, 1920, No. 1, U. S. Bureau of Education."

[2] "'High School Mathematics,' by G. W. Evans, Headmaster of Charleston High School."

[3] "Bulletin, 1917, No. 10, U. S. Bureau of Education."